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International Specialists in the Environment

FIELD OPERATIONS WORK PLAN
FOR
RESOURCE RECOVERY CORP./PASCO SANITARY LANDFILL
PASCO, WASHINGTON

TDD NO.: F10-8701-04

Report Prepared By: Ecology And Environment, Inc.
Date: March 1987

Submitted To: J.E. Osborn, Regional Project Manager
Field Operations And Technical Support Branch
U.S. Environmental Protection Agency
Region X
Seattle

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FIELD OPERATIONS WORK PLAN

PROJECT NAME: RESOURCE RECOVERY CORP./PASCO SANITARY LANDFILL
SITE INSPECTION
CONTRACT No.: 68-01-7347
TDD No.: F10-8701-04
DATE: MARCH 1987

ECOLOGY AND ENVIRONMENT, INC., SEATTLE

FIT-OM: Thomas A. Nolan DATE: 3/23/87

E&E PROJECT MANAGER: Jeff Villars DATE: 3/24/87

QA OFFICE CONCURRENCE: _____ DATE: _____

ESD PEER REVIEW: _____ DATE: _____

PROJECT NO. _____ ACCOUNT NO. _____

LABORATORY DESIGNATED: _____ EPA _____ CLP _____ PRIVATE

SAMPLE NUMBERS ASSIGNED: FROM _____ TO _____

SAMPLE CONTROL CENTER (ESD) : _____ DATE: _____

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1.0 INTRODUCTION

Pursuant to U.S. Environmental Protection Agency (EPA) Contract Number 68-01-7347 and Technical Directive Document (TDD) Number F10-8701-04, Ecology and Environment, Inc. (E&E) is conducting a ground water sampling program at the Resource Recovery Corporation/Pasco Sanitary Landfill Site near Pasco, Washington. This document describes the objectives and scope of the investigation, and details the procedures to be followed during performance of the field work.

Since 1973, several investigations of site conditions have been performed by Washington Department of Ecology (Ecology) and EPA personnel (1, 2, 3), and by consultants under contract to the site owners (4, 5). In studies conducted by E&E in 1985, inorganic ground water data from on-site monitoring wells were found to be orders of magnitude greater, in general, than data collected previously (3). Additional sampling, conducted by EPA in 1986, indicated the source of these discrepancies was related to heavy siltation of many of the wells and the use of different sample collection techniques in the various investigations (6). EPA's 1986 sampling also indicated low level organics contamination of several domestic wells downgradient of the landfill, a condition potentially related to the site which had not been previously identified.

As a result of past problems with inorganic data, and due to the recent indication of downgradient contaminant migration, EPA tasked E&E to further evaluate on- and off-site ground water quality at Pasco Sanitary Landfill. It is anticipated that 14 on-site monitoring wells and seven water supply wells will be sampled during the investigation for EPA Hazardous Substance List (HSL) organic and inorganic compounds. Contingency plans are included in the proposed scope of work to allow comparisons of the effectiveness of different sampling methods, should two or more methods be required to collect samples.

2.0 PROJECT DESCRIPTION

2.1 Objectives and Scope

The objectives of the Pasco Sanitary Landfill Sampling Program are to:

- o further define the magnitude of on-site and downgradient ground water contamination of selected wells by HSL organic and inorganic compounds; and
- o determine the magnitude of total, hexavalent, and trivalent chromium contamination in the Savage & Sons' domestic well.

To accomplish these objectives, the following tasks will be conducted:

- o collect ground water samples from the nine on-site monitoring wells installed by E&E in 1985 (EE-1 through EE-9), from five on-site wells installed by J-U-B Engineers (JUB) in 1982 (JUB-1 and JUB-2), and from seven water supply wells;
- o obtain static water level measurements;

- o analyze samples for HSL volatile and base/neutral/acid (BNA) extractable compounds, polychlorinated biphenyls (PCBs), pesticides, and inorganic elements (total and dissolved for monitoring wells, total only for domestic wells except Savage and Sons); and

- o analyze the Savage & Sons' domestic well for total, trivalent, and hexavalent chromium (dissolved fraction).

2.2 Site Location and History

The Pasco Sanitary Landfill is located 1.5 miles northeast of Pasco, Washington, in the Southwest 1/4 of Section 15 and the Northwest 1/4 of Section 22, Township 9 North, Range 30 East, Willamette Meridian, Franklin County, Washington (Figures 1 and 2). The site lies in an area dominated by irrigated agricultural fields and rangeland at an average elevation of approximately 410 feet above mean sea level (3).

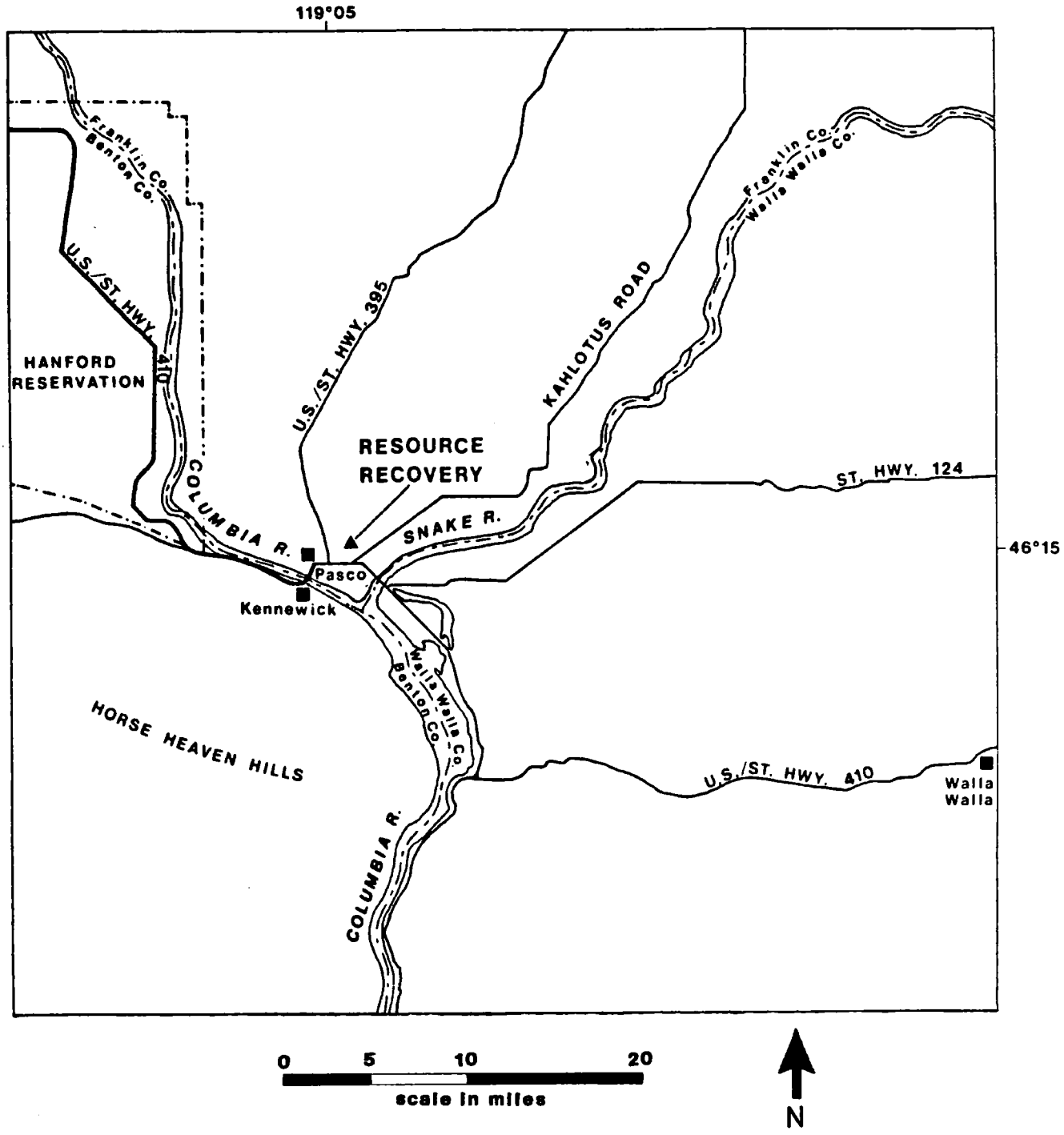
Pasco Sanitary Landfill, originally known as the Basin Disposal Company Dump Site, was owned and operated by John Dietrich as an open municipal waste burning dump from 1956 to 1971. In 1971, all burning was halted and the site was converted into a sanitary landfill. In 1974, the landfill began accepting large quantities of septic wastes for open pit disposal (3).

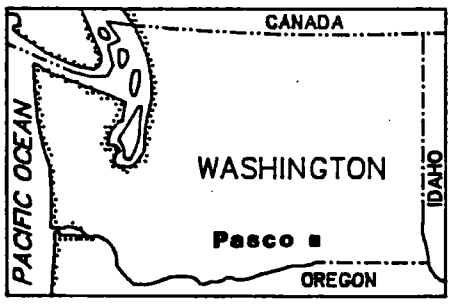
Resource Recovery Corporation (RRC) was formed by a partnership between Basin Disposal Company and Chemical Processors, Inc., of Seattle (Larry Dietrich, Waste Site Operator/Manager). RRC leased a portion of Pasco Sanitary Landfill in 1972 and began operations as a regional hazardous waste disposal site under Washington Department of Ecology Permit No. 5301 issued March 21, 1973 (3). RRC accepted potentially hazardous wastes from various sources between early 1972 and December 1974, and operated the site until January 1981. In 1981, the operation lease terminated and all interests RRC had in the operation reverted to the Dietrichs. The sanitary landfill operation, continued throughout the period that RRC leased the site, has been under the direction of Larry Dietrich since 1981 (3).

Several investigations have been conducted at the site since 1973 to evaluate potential environmental problems associated with hazardous waste disposal (1, 2, 3, 4, 5, 6). A summary of the major activities and conclusions of the most significant of these investigations is presented in Table 1. Of primary importance to this study are results of EPA's sampling efforts in 1986 wherein low-level, off-site migration of organic compounds was potentially detected, and during which anomalous inorganic data collected in previous studies was attributed to siltation problems in many of the on-site wells (6).

2.3 Data Use

Quality assured data will be used to further characterize the impact of waste disposal practices at the landfill on the local environment. Duplicate, rinsate, and blank water samples will be included to provide indications of contaminant distribution, sampling error, and analytical consistency.





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Job: F10-8701-04	Waste Site: FWA0280SSA
Drawn by: B. Tookey	Date: 2/23/1987

FIGURE 1
LOCATION MAP
RESOUCE RECOVERY CORPORATION
Pasco, WA

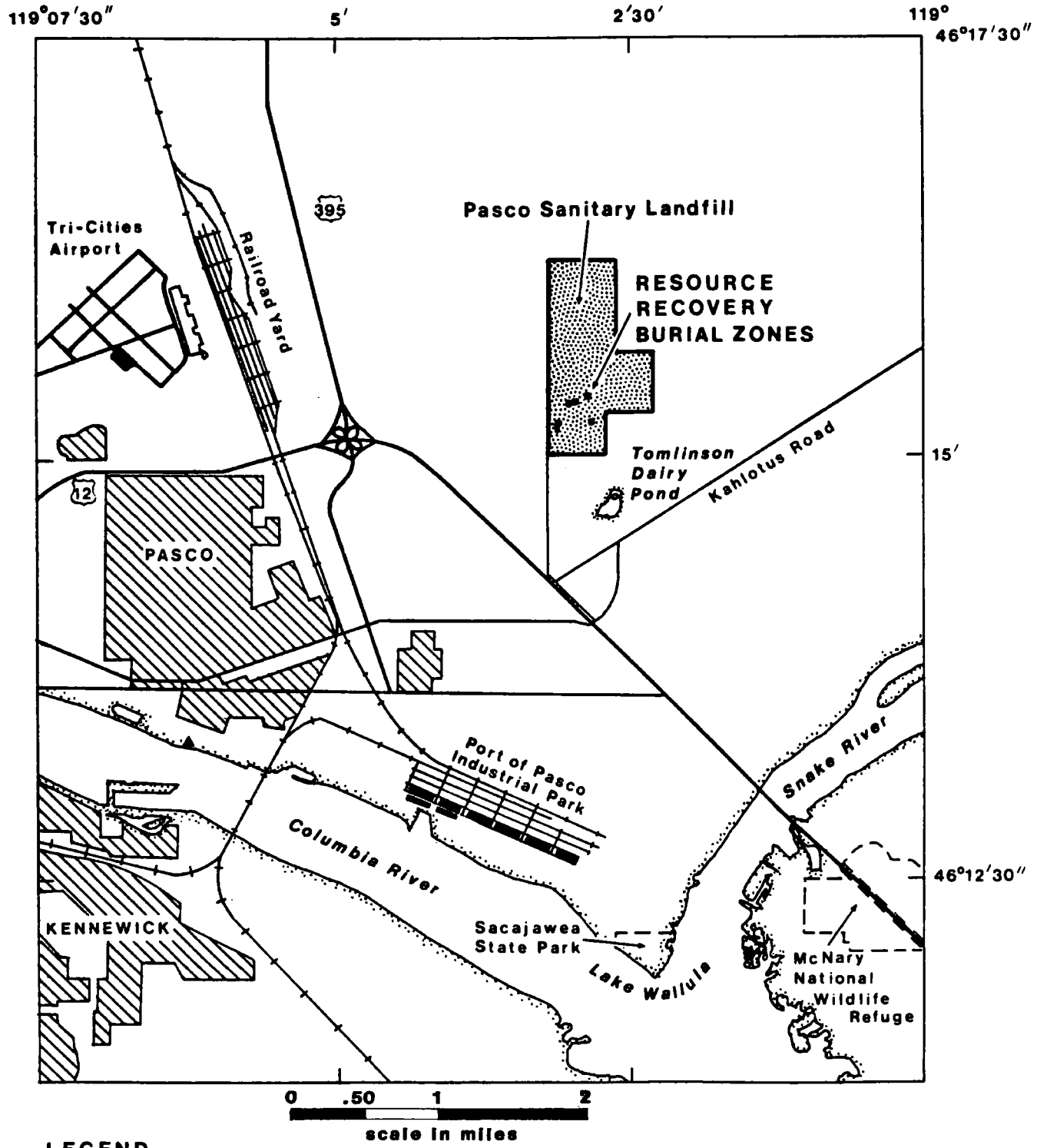

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FIGURE 2
VICINITY MAP
RESOURCE RECOVERY CORPORATION
Pasco, WA

TABLE 1

SUMMARY OF PREVIOUS ENVIRONMENTAL INVESTIGATIONS AT PASCO SANITARY LANDFILL[1]

Year	Investigator	Major Activities	Conclusions
1973	WA Dept. of Ecology	o Site visit and interviews o File reviews	o Location appropriate for disposal of industrial solid wastes. o Liquid waste disposal inappropriate due to shallow water table. o Permit issued for landfill to accept potentially hazardous wastes. Permit life 1973-1974.
1982 - 1983	J-U-B	o Six monitoring wells installed under a subcontract from RR/PSL. o Quarterly sampling for HSL inorganics and cyanide	o Analytical results below EPA allowable contaminant levels o Quarterly monitoring to continue under Ecology order
1984	E&E/EPA	o Site visit and interviews o Three ground water samples collected; analyzed for HSL organic and inorganic compounds	o No evidence of organic contamination o Upgradient (control) well exhibited higher levels of inorganics than downgradient wells o General increase in contaminant levels over previous sampling results
1985	E&E/EPA	o Nine additional on-site wells installed including one new control well o Ground water and soil samples collected	o Evidence of on-site ground water contamination by organic compounds o Significant increases of inorganic levels over previous sampling o Potential off-site migration
1986	EPA	o Eight drinking water wells sampled o Three monitoring wells sampled	o Low level organics detected in several wells below drinking water standards o Anomalous inorganic data in on-site monitoring wells attributed to siltation in wells and use of different sampling techniques between various investigations o More data needed to identify sources of contaminants; resampling planned to ensure levels remain safe.

1 Complete references follow Field Operations Work Plan.

3.0 PROJECT MANAGEMENT

3.1 Project Organization and Responsibility

The following is a list of the key personnel and their responsibilities:

E&E Regional Project Manager	:	David Buecker, E&E, Seattle
EPA Project Officer	:	John Osborn, USEPA, Region X
EPA QA Officer	:	W. Towns, USEPA, Region X
E&E Project Manager	:	Jeff Villnow, E&E, Seattle
Data Quality Review (EPA Lab)	:	Dr. J. Blazevich, USEPA Region X
Data Quality Review (CLP Lab)	:	Andrew Hafferty, E&E, Seattle
System Performance Audit	:	per REM/FIT Quality Assurance Manual

3.2 Schedule of Tasks and Milestones

The proposed work schedule for the completion of this site inspection is summarized in the milestone chart presented in Table 2.

TABLE 2

MILESTONE CHART

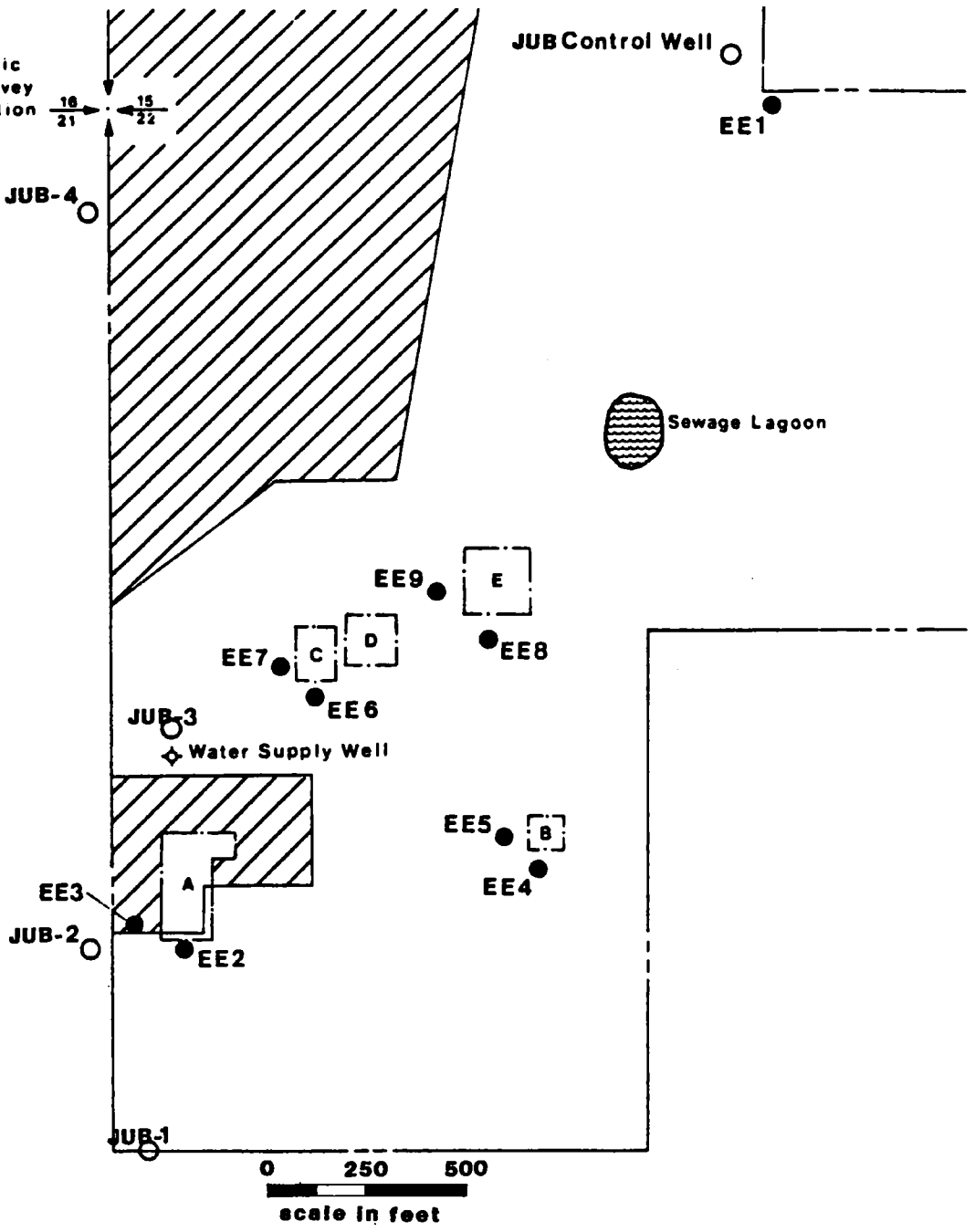
Activity	1/87	2/87	3/87	4/87	5/87
TDD Assigned	1/7				
Work Plan/QA Preparation and Review		———	———		
Field Work			—		
Sample Analysis				———	———
QA Data					———
Report Preparation					———
Final Report **					

** - Dependent upon receipt and QA of analytical results

4.0 SAMPLING PROGRAM

4.1 Sample Types, Quantities, and Analytical Requirements

Ground water samples will be collected from 14 on-site monitoring wells and one on-site water supply well (Figure 3), and from six off-site domestic wells (Figure 4) and analyzed through the EPA Contract Laboratory Program (CLP) for all HSL organic and inorganic compounds, except cyanide



LEGEND

- Municipal waste disposal zones
- [C] Location and name of Resource Recovery burial zone
- ---- Boundary of Pasco Sanitary Landfill
- JUB-4 ○ Location and number of existing monitoring well
- EE9 ● Location and number of Ecology and Environment monitoring well

N

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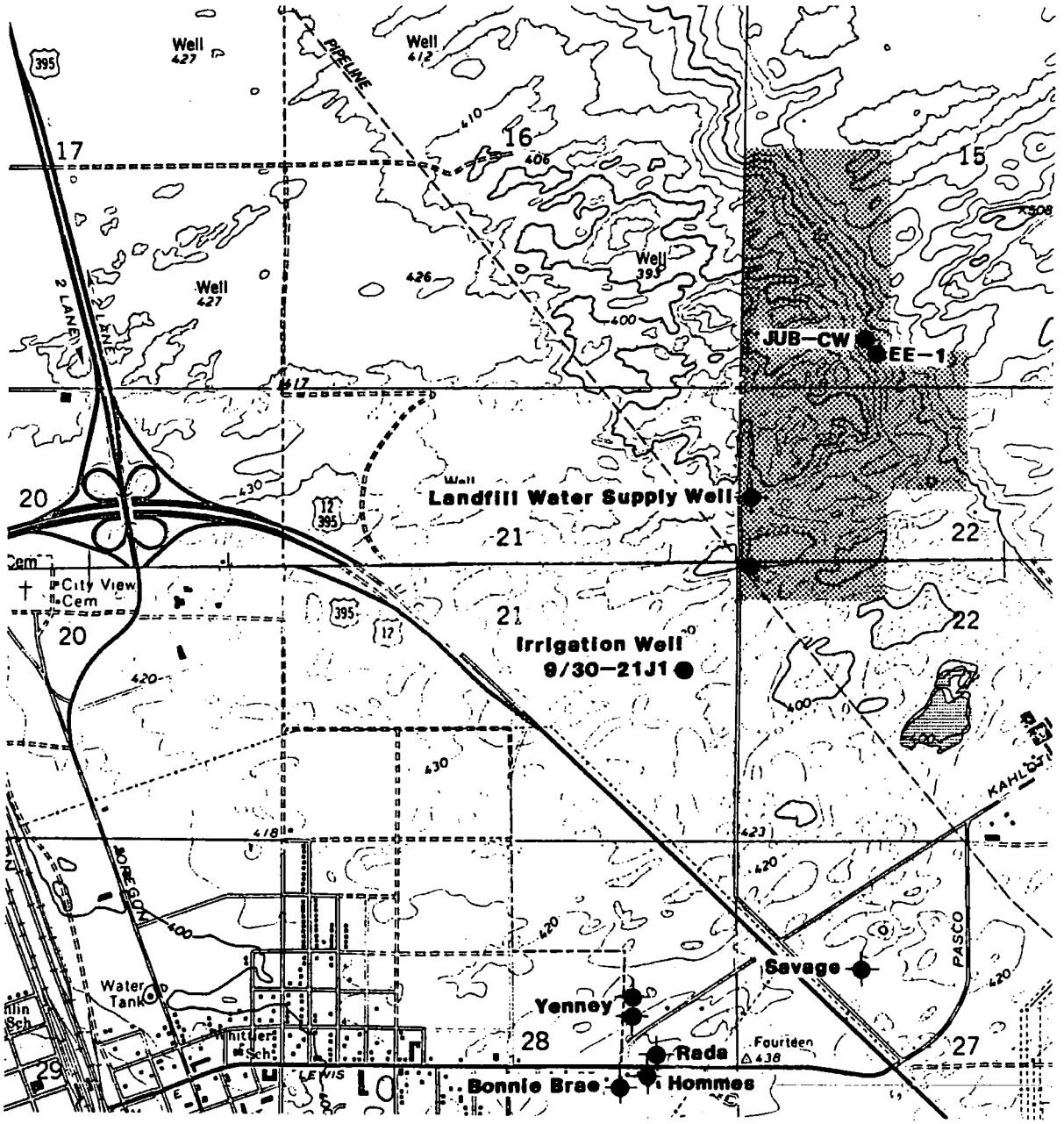
FIGURE 3
MONITORING WELL LOCATION MAP
RESOURCE RECOVERY CORPORATION
Pasco, WA



LEGEND

- Rada Location and Name of Domestic Well
- Location and Name of Monitoring Well

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FIGURE 4
DOMESTIC WELL LOCATION MAP
NEAR RESOURCE RECOVERY CORPORATION
Pasco, WA

(Appendix A). Inorganic analyses will be performed for both total and dissolved metals in each monitoring well sample, and for total metals in each domestic well sample. In addition, the Savage and Sons' domestic well will be analyzed for trivalent and hexavalent chromium (dissolved fraction).

Quality assurance samples will include transport blanks, duplicates, and rinsate samples. An anticipated total of five transport blanks will be prepared at a frequency of one per sample shipment to check for bottle contamination and/or potential problems during sample shipments. Approximately 10% of the well samples (two estimated) will be flagged for duplicate analyses to evaluate consistency of the sampling technique and assess laboratory performance. Rinsate samples will be collected three times from the well purging pump to evaluate the adequacy of the equipment decontamination process. Table 3 summarizes the anticipated sampling program.

TABLE 3

ANTICIPATED SAMPLE TYPES, NUMBERS, AND ANALYTICAL REQUIREMENTS

Matrix	Anticipated # of Samples	Anticipated Number of QA Samples			Anticipated Total	Sample Type	Analytical Requirements
		Transport blanks	Duplicates	Rinsate			
Ground Water	23[1]	5[2]	2	3[3]	33	Grab (Unfiltered)	HSL (Minus CN^-)
	14	0	2	0	16	Grab (Filtered)	Dissolved Metals
	1	0	0	0	1	Grab (Filtered)	Cr^{3+}, Cr^{6+}

1 Includes nine on-site wells installed by E&E and five installed by J-U-B, one on-site water supply well, six off-site water supply wells, and provisions for collecting two additional samples using a second collection technique for comparison purposes (see Section 4.2).

2 Includes one transport blank per sample shipment, estimated at one shipment per day for five days.

3 Includes one rinsate sample following decontamination of the purging pump (see Section 4.2) at each of the 14 on-site monitoring wells.

4.2 Sampling Methodologies

Each of the on-site monitoring wells and one water supply well (Old Yenney well) will be sampled using a bladder pump to be supplied by J-U-B Engineers. Samples will be collected following a five-step process:

- o decontaminate the bladder pump as described in Section 4.6 and obtain a rinsate sample using carbon-free water;
- o obtain static water level measurement and calculate static volume;
- o install bladder pump and purge three static volumes into 55-gallon DOT-approved drums;
- o monitor purge water for pH, temperature, and conductivity at 10 minute intervals; and
- o obtain samples directly from the discharge port of the pump line.

With the exception of the Old Yenney well, samples from water supply wells will be collected at the household faucet without purging to reflect water quality at the point of use. In all cases, samples for volatiles analyses will be collected first, followed by samples for BNAs, pesticides, and PCBs, and finally, samples for total metals, dissolved metals, and field measurements (pH, temperature, conductivity).

In the event that the bladder pump becomes non-functional, a hand operated displacement pump will be utilized to purge remaining wells. The pump will be decontaminated prior to entering the field and sealed in a clean plastic bag. Upon breaking the seal, a rinsate sample will be immediately collected and the pump will be installed in the last well sampled using the bladder pump. The well will be repurged, if necessary, using the displacement pump and sampled using a new PVC bailer for comparison purposes. Remaining wells will then be sampled using the previously described five-step process, with the displacement pump replacing the bladder pump.

4.3 Laboratory Notification

Prior to commencing sampling activities at the site, the Sample Control Officer of the Region X EPA Environmental Services Division (ESD) will designate the laboratory(s) where collected samples are to be shipped. The E&E project manager will notify the designated contract laboratory through the Sample Control Office of ESD of the confirmed day(s) on which sampling is to occur, and consequently, when samples will be shipped. The project manager will also confirm the sample documentation numbers, the number of samples to be shipped and the type of analyses required, and verify their arrival at the designated laboratory through the Sample Control Officer.

4.4 Sample Documentation and Handling

The potential evidentiary nature of the data collected during the investigation requires that the possession of samples be traceable from the time they are collected until they are introduced as evidence during

enforcement proceedings. All sample documentation and Chain-of-Custody procedures will be as specified in the National Enforcement Investigations Center policy and procedures guidelines (7).

All sampling data (date and time of collection, sampling station, field measurements, etc.) will be recorded in a field note book and will be immediately transferred to the appropriate field documentation form(s).

Filled sample bottles will be capped and sealed with cellophane tape and EPA custody tape. All sample bottles will be placed inside two 4-mil plastic bags. These protective bags with the samples will then be placed inside the sample shipping containers (i.e., ice chest). Prior to shipping, each protective bag will be sealed using strapping tape. Vermiculite and/or bubble pack will be used to fill up the empty space in the cooler and to act as a shock absorbent during shipping.

Samples will be accompanied by Region X Field Sample Data Sheets, Chain-of-Custody forms, CLP Traffic Report Forms, and any other pertinent shipping/sampling documentation information. These forms will be placed in a ziplock bag and taped to the inside of the ice chest.

The cooler containing the samples and the documentation will then be sealed with fiberglass strapping tape. Chain-of-Custody seals will be placed across the front and back of the lid of all shipping coolers after the coolers have been filled. Packaging will conform to the requirements of the National Enforcement Investigation Center (8). Samples will be shipped to the designated laboratory by overnight carrier within 24 hours of collection.

Laboratory sample handling criteria are summarized in Table 4.

TABLE 4

SAMPLE HANDLING SUMMARY

Matrix	Parameter	Maximum Holding Time	Preservatives
Water	Inorganics[1]	6 mo.	Ice
	Volatiles/ BNAs	7 days	Ice
	Pesticides/ PCBs	5 days	Ice

1 Maximum holding time for hexavalent chromium is 24 hours. Other HSL metals holding times are six months.

4.5 Investigation-Derived Wastes

The types of investigation-derived wastes that will be generated during the investigation include purge water, decontamination fluids, and clothing. It is anticipated that the sampling of 14 on-site monitoring wells will generate approximately 30 drums of purge water and one drum of decontamination solution.

Purge water from each of the on-site monitoring wells will be segregated by borehole and drummed. Purge water from the off-site water supply wells will be discharged to the ground surface. Disposable equipment (protective clothing, miscellaneous refuse, etc.) will be double-bagged for disposal in the Pasco Sanitary Landfill with the owner's permission.

An E&E label will be placed on each drum containing investigation-derived wastes. The labels will contain the following information:

Site Name:
Sequential Number:
Date of Collection:
Source of Waste Material: (i.e., Well #1)
Type of Waste Material: (i.e., purge water)

All information on the drum labels will be recorded in the field notebook. A final inventory of all investigation-derived wastes will be made at the end of the field project. Drummed wastes will be stored on site with the owner's permission. Upon receipt of analytical data, recommendations for disposal of the drummed wastes will be presented to EPA for approval.

4.6 Personal Safety and Equipment Decontamination

Personal safety and decontamination procedures will be addressed in the Site Investigation Health and Safety Plan.

Where possible, disposable sampling and personal safety equipment will be used. When decontamination is required, equipment will be decontaminated prior to and following its use in the contaminated area. The decontamination procedure will include a consecutive series of each of the following washes/rinses:

- o alconox wash;
- o clean water rinse;
- o acetone rinse;
- o methanol rinse;
- o distilled water rinse; and
- o carbon-free water rinse.

5.0 QUALITY ASSURANCE PROCEDURES

5.1 Quality Assurance Objectives

The general QA objectives for this project are to develop and implement procedures for obtaining and evaluating data which can be used to

assess site hazards, develop and evaluate alternative remedial actions, and be legally defensible in a court of law. In order to provide legally defensible data, it is necessary that all measurement data have an appropriate degree of accuracy and reproducibility, along with the assurance that all samples collected are appropriately representative of actual field conditions.

All collected samples must meet the quality control objectives (i.e., method, detection limits, precision, accuracy, completeness, etc.) for the particular parameter requested (i.e., heavy metals, base/neutral/acid extractable compounds, etc.) as specified by the Contract Laboratory Program (CLP) or the USEPA Region X Laboratory.

Standard Operating Procedures (SOPs) have been developed which detail the procedures for performing all tests at an acceptable level of quality control (9). The SOPs also ensure that the data is comparable, interpretable and defensible.

5.2 Quality Assurance Checks

5.2.1 Calibration Frequency and Procedures

All field equipment used during the site investigation will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations. Operation, calibration , and maintenance will be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and measurement will be maintained throughout the duration of the sampling program. Preventive maintenance and check procedures for field instruments likely to be used during the site inspection sampling are described in Table 5.

TABLE 5

CALIBRATION AND FIELD CHECK FREQUENCY SCHEDULES

Equipment*[1]	Regular Calibration and Maintenance Required[2]	Field Check Prior to Shipment[3]	Field Calibration Required Before Each Use[3]
Conductivity Meter		X	X
pH Meter		X	X
Water Level Indicator		X	X
OVA	Monthly	X	X

1 - Equipment routinely used during a site inspection/sampling
2 - To be performed by designated regional instrument repairman
3 - These calibrations and checks are to be performed by the site field team

5.2.2 Internal Quality Control Checks

Quality control checks for sample collection will be accomplished by a combination of the following procedures:

- Duplicate samples: Duplicates will be submitted in order to evaluate the precision of the laboratory results. The number of duplicate samples required by the field sampling will be at least 10% of the total of each sample type.

- Blank Samples: Sample blanks (transfer/transport) will be included in each set of water samples collected during the sampling program. The blanks will consist of carbon-free water.

- Chain-of-Custody: Standard EPA chain-of-custody protocols will be followed in order to preserve the legal integrity of the samples between the time of collection and analysis (7).

- Laboratory QA: Analytical procedures will be evaluated by using items such as surrogate spikes, matrix spikes, duplicates, reagent blanks, and inter-element correction checks.

5.3 Data Reduction, Validation, and Reporting

Where analytical data have been reduced, the method of reduction will be described in the final site investigation report.

Validation of all analytical data will be performed by senior chemists at Ecology and Environment, Inc., or at the Region X USEPA Laboratory. Laboratories participating in the CLP will be required to submit results which are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of the data. Validity of all data will be determined based on the precision and accuracy assessments required by the USEPA. Upon completion of the review, the senior chemist will be responsible for developing a QA report for each analytical package. All data will be stored and maintained according to standard document control procedures.

All raw data generated from the project sampling tasks and used in the final site inspection report will be appropriately identified in a separate appendix within the final report.

5.4 Performance and System Audits

The Regional EPA Laboratory or the contract laboratory facilities used by Ecology and Environment, Inc. personnel will be required to take part in a series of performance and systems audits conducted by the National Enforcement Investigations Center (7). Laboratory Quality Control data and performance evaluations will be submitted along with analytical results for assessment by program reviewers.

Performance and system audits for E&E sampling operations will consist of on-site reviews of field Quality Assurance systems and equipment for sampling, calibration, and measurement consistent with the Zone II REM/FIT Quality Assurance Manual (Contract No. 68-01-6692). The program Quality

Assurance Coordinator will develop and conduct system audits based on the approved project sampling Work Plan/QA Plan. Guidelines provided by the NEIC for performing audits of field activities will be followed (7).

If for any reason the schedules or procedures presented herein cannot be followed, a "Sample Alteration Checklist" (see Appendix B) will be completed for each element changed. The checklist will be reviewed by the Project Officer and the QA Officer/Peer Reviewer.

6.0 REPORTS

No separate report to describe the performance of data measurement systems or data quality is anticipated. A memorandum presenting recommendations for disposal of drummed wastes will be submitted with the final report. The final investigation report will contain a separate Quality Assurance (QA) appendix presenting memoranda from the E&E review staff that summarize data quality information collected during the project. QA memoranda pertaining to drinking water sample results will be clearly identified and forwarded to EPA upon completion of QA reviews with draft letters to individual well owners regarding results. Sample data will be summarized in tables by E&E. The data summaries will be attached to all reports when applicable.

REFERENCES

1. Washington Department of Ecology, 1973. Resource Recovery Corporation Industrial Disposal Site Evaluation.

2. Ecology and Environment, Inc., 1985. Preliminary Site Inspection Report of Resource Recovery Corporation, Pasco, Washington. Prepared under U.S. Environmental Protection Agency Contract No. 68-01-6692, Technical Directive Document No. R10-8408-22.

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7. _____, 1985. NEIC Policies and Procedures, National Enforcement Investigations Center, Denver, CO.

8. _____, 1980. Enforcement Considerations for Evaluations of Uncontrolled Hazardous Waste Disposal Sites by Contractors, National Enforcement Investigations Center, Denver, CO.

9. U.S. Environmental Protection Agency, 1985. Statement of Work for Organic Analyses, EPA-IFB WA85-266.

ADDITIONAL REFERENCES

USEPA, 1985. Quality Assurance Manual for Drinking Water Programs Investigations.

_____, 1982. Technical Additions to Methods for Chemical Analysis of Water and Wastes, EPA-600/4-82-055.

_____, 1982. Methods for Organic Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057.

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APPENDIX A

EPA HAZARDOUS SUBSTANCE LIST (HSL)

ANALYTICAL REQUIREMENTS

Analytical methods and data quality from contract laboratories is described in detail in IFB WA 85-J-176, Chemical Analytical Services for Organics, and IFB WA 85-J838, Chemical Analytical Services for Inorganics. All contract laboratories are required to conform to these standards.

TABLE A-1

ORGANICS ANALYSES

Volatile Compounds	Contract Required Detection Limits *	
	Low Concentration Water [c] (ug/l)	Low Concentration Soil/Sediment [d] (ug/kg)
1. Chloromethane	10	10
2. Bromomethane	10	10
3. Vinyl Chloride	10	10
4. Chloroethane	10	10
5. Methylene Chloride	5	5
6. Acetone	10	10
7. Carbon Disulfide	5	5
8. 1,1-Dichloroethene	5	5
9. 1,1-Dichloroethane	5	5
10. trans-1.2-Dichloroethene	5	5
11. Chloroform	5	5
12. 1,2-Dichloroethane	5	5
13. 2-Butanone	10	10
14. 1,1,1-Trichloroethane	5	5
15. Carbon Tetrachloride	5	5
16. Vinyl Acetate	10	10
17. Bromodichloromethane	5	5
18. 1,1,2,2-Tetrachloroethane	5	5
19. 1,2-Dichloropropane	5	5
20. trans-1,3-Dichloropropene	5	5
21. Trichloroethene	5	5
22. Dibromochloromethane	5	5
23. 1,1,2-Trichloroethane	5	5
24. Benzene	5	5
25. cis-1,3-Dichloropropene	5	5
26. 2-Chloroethyl Vinyl Ether	10	10
27. Bromoform	5	5
28. 2-Hexanone	10	10
29. 4-Methyl-2-pentanone	10	10
30. Tetrachloroethene	5	5
31. Toluene	5	5
32. Chlorobenzene	5	5
33. Ethyl Benzene	5	5
34. Styrene	5	5
35. Total Xylenes	5	5

TABLE A-1 (CONT.)

Extractable Organic Compounds	Contract Required Detection Limits * Low Concentration Water [c] (ug/l)	Low Concentration Soil/Sediment [d] (ug/kg)
1. N-Nitrosodimethylamine	10	330
2. Phenol	10	330
3. Aniline	10	330
4. bis(2-Chloroethyl) Ether	10	330
5. 2-Chlorophenol	10	330
6. 1,3-Dichlorobenzene	10	330
7. 1,4-Dichlorobenzene	10	330
8. Benzyl Alcohol	10	330
9. 1,2-Dichlorobenzene	10	330
10. 2-Methylphenol	10	330
11. bis(2-Chloroisopropyl) Ether	10	330
12. 4-Methylphenol	10	330
13. N-Nitroso-dipropylamine	10	330
14. Hexachloroethane	10	330
15. Nitrobenzene	10	330
16. Isophorone	10	330
17. 2-Nitrophenol	10	330
18. 2,4-Dimethylphenol	10	330
19. Benzoic Acid	50	330
20. bis(2-Chloroethoxy)methane	10	1600
21. 2,4-Dichlorophenol	10	330
22. 1,2,4-Trichlorobenzene	10	330
23. Naphthalene	10	330
24. 4-Chloroanaline	10	330
25. Hexachlorobutadiene	10	330
26. 4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10	330
27. 2-Methylnaphthalene	10	330
28. Hexachlorocyclopentadiene	10	330
29. 2,4,6-Trichlorophenol	10	330
30. 2,4,5-Trichlorophenol	50	1600
31. 2-Chloronaphthalene	10	330
32. 2-Nitroanaline	50	1600
33. Dimethyl Phthalate	10	330
34. Acenaphthylene	10	330
35. 3-Nitroaniline	50	1600

TABLE A-1 (CONT.)

Extractable Organic Compounds	Contract Required Detection Limits * Low Concentration Water [c] (ug/l)	Low Concentration Soil/Sediment [d] (ug/kg)
36. Acenaphthene	10	330
37. 2,4-Dinitrophenol	50	1600
38. 4-Nitrophenol	50	1600
39. Dibenzofuran	10	330
40. 2,4-Dinitrotoluene	10	330
41. 2,6-Dinitrotoluene	10	330
42. Diethylphthalate	10	330
43. 4-Chlorophenyl Phenyl Ether	10	330
44. Fluorene	10	330
45. 4-Nitroaniline	50	1600
46. 4,6-Dinitro-2-methylphenol	50	1600
47. N-nitrosdiphenylamine	10	330
48. 4-Bromophenyl Phenyl Ether	10	330
49. Hexachlorobenzene	10	330
50. Pentachlorophenol	50	1600
51. Phenathrene	10	330
52. Anthracene	10	330
53. Di-n-butylphthalate	10	330
54. Fluoranthene	10	330
55. Benzidine	50	1600
56. Pyrene	10	330
57. Butyl Benzyl Phthalate	10	330
58. 3,3'-Dichlorobenzidine	20	660
59. Benzo(a)anthracene	10	330
60. bis(2-Ethylhexyl)phthalate	10	330
61. Chrysene	10	330
62. Di-n-octyl Phthalate	10	330
63. Benzo(b)fluoranthene	10	330
64. Benzo(k)fluoranthene	10	330
65. Benzo(a)pyrene	10	330
66. Indeno(1,2,3-cd)pyrene	10	330
67. Dibenz(a,h)anthracene	10	330
68. Benzo(g,h,i)perylene	10	330

TABLE A-1 (CONT.)

Pesticide Compounds	Contract Required Detection Limits * Low Concentration Water [c] (ug/l)	Low Concentration Soil/Sediment [d] (ug/kg)
1. alpha-BHC	.05	2
2. beta-BHC	.05	2
3. delta-BHC	.05	2
4. gamma-BHC (Lindane)	.05	2
5. Heptachlor	.05	2
6. Aldrin	.05	2
7. Heptachlor Epoxide	.05	2
8. Endosulfan I	.05	2
9. Dieldrin	.1	4
10. 4,4'-DDE	.1	4
11. Endrin	.1	4
12. Endosulfan II	.1	4
13. 4,4'-DDD	.1	4
14. Endrin Aldehyde	.1	4
15. Endosulfan Sulfate	.1	4
16. 4,4'-DDT	.1	4
17. Endrin Ketone	.1	4
18. Methoxychlor	.5	20
19. Chlordane	.5	20
20. Toxaphene	1.0	40
21. AROCHLOR 1016	.5	20
22. AROCHLOR 1221	.5	20
23. AROCHLOR 1232	.5	20
24. AROCHLOR 1242	.5	20
25. AROCHLOR 1248	.5	20
26. AROCHLOR 1254	1.0	40
27. AROCHLOR 1260	1.0	40

* Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable.

a Medium Water Contract Required Detection Limits (CRDL) for Volatile HSL Compounds are 100 times the individual Low Water CRDL.

b Medium Soil/Sediment Contract Required Detection Limits (CRDL) for Volatile HSL Compounds are 100 times the individual Low Soil/Sediment CRDL.

TABLE A-1 (CONT.)

c Medium Water Contract Required Detection Limits (CRDL) for Semi-Volatile HSL Compounds are 100 times the individual Low Water (CRDL).

d Medium Soil/Sediment Contract Required Detection Limits (CRDL) for Semi-Volatile HSL Compounds are 60 times the individual Low Soil/Sediment (CRDL).

e Medium Water Contract Required Detection Limits (CRDL) for Pesticide HSL Compounds are 100 times the individual Low Water (CRDL).

f Medium Soil/Sediment Contract Required Detection Limits (CRDL) for Pesticide HSL Compounds are 60 times the individual Low Soil/Sediment (CRDL).

TABLE A-2

INORGANIC ANALYSES

Element	Contract Required Detection Limits * Low Concentration Water (ug/l)
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	5
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Tin	40
Vanadium	50
Zinc	20
Cyanide	10

* Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable.

APPENDIX B

SAMPLE ALTERATION CHECKLIST

SAMPLE ALTERATION CHECKLIST

Project Name and Number:

Material to be Sampled:

Measurement Parameter:

Standard Procedure for Field Collection & Laboratory Analysis (cite references):

Reason for Change in Field Procedure or Analytical Variation:

Variation from Field or Analytical Procedure:

Special Equipment, Materials, or Personnel Required:

Initiator's Name: _____ Date: _____

Project Approval: _____ Date: _____

Laboratory Approval: _____ Date: _____

QA Officer/Reviewer: _____ Date: _____

Sample Control Center: _____ Date: _____